A STUDY TO DETERMINE THE VALUE OF PREDICTIVE TESTS IN RELATION TO HUMAN ECOLOGY

Myrtle Polley

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A STUDY TO DETERMINE THE VALUE OF PREDICTIVE TESTS IN RELATION TO HUMAN ECOLOGY

by

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In Partial Fulfillment of the Requirements for the Degree of Master of Science in Nursing Education

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CHAPTER I

THE PROBLEM IN ITS SETTING

The following report is one phase of a larger study to appraise the effectiveness of the Human Ecology course which was initiated in the basic collegiate program of the Boston University School of Nursing in the fall of 1953. The purposes of the course as originally stated were as follows:

1. To select available biological science materials which are essential as a base for the education of the professional nursing student.
2. To organize these materials into an integrated course so that there would be no unnecessary duplication.
3. To present these materials from the multiple science areas in meaningful relationships.
4. To teach the course in terms of problem-solving situations related to health and nursing needs.
5. To provide for student growth through problem-solving experiences requiring an integrated scientific base which is progressively more complex.[1]

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[1] Reilly, Dorothy E., and Bowen, Eleanor Page. "Development of an Academic Year Central Collegiate Teaching Plan for Pre-Clinical Sciences for Schools of Nursing," p. 8. Unpublished Master's thesis. Boston: Boston University School of Nursing, 1950-51.

The over-all larger study contains both long term and short term objectives. The first of the short term objectives is related to measuring the knowledge or achievement of the student. The measurement of student achievement was done in two ways: (1) through written examinations prepared by the teaching staff of Human Ecology and administered weekly throughout the course and at the end of each semester, and (2) through the administration of National League for Nursing (N.L.N.) science achievement tests. The latter have been standardized from the achievement of students in basic three year schools of nursing. Norms have not yet been established for those students in collegiate programs.

If the achievement tests are reliable, and if the written examinations given in the course tested similar areas as were included in the achievement tests, it could be assumed that there would be a meaningful relationship between the achievement test scores and student ability as demonstrated by grades in Human Ecology.

Statement of the Problem

The present study is an attempt to test the above hypothesis.

Enrolled in the program were three different types of students. There were Boston University sophomores who had had a year in which to become oriented to college life. Also they had had a year of college chemistry and general biology before entering the program. A group of students were enrolled in a three year school of nursing, simultaneously with their participation in Human Ecology. These students, in their own school, were having different courses from the Boston

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University School of Nursing sophomores and freshmen. Because the freshmen were the level of students who would be enrolled in the course of subsequent years, and because the course has been designed to fit into the total balanced, unified, and steadily progressive program, it seemed more desirable to limit the sample used in the present study to the twenty-two Boston University freshmen.

Limitations of the Study

There are certain limitations in the study. The fact that this is the first time the course was offered is in itself a limiting factor. Continuing post-presentation conferences revealed a need for reorganization of materials, changes in presentation, and so on. The inclusion of sophomores who had the benefit of more and broader preparation than the freshmen may have meant that a higher achievement by this group could work to a disadvantage in the percentile achievement of the freshmen. This factor should not have interfered with the placement of the student in relation to other students in the freshman class.

A second limitation may lie in the fact that the teacher-made tests have not yet been fully validated.

A third limitation may lie in the differences in the philosophy which underlies the National League for Nursing science achievement tests and that which is basic to Human Ecology. In Human Ecology it is anticipated that knowledge areas will be increased, strengthened, and deepened throughout the program. As a result the content of the course may differ from that which was considered essential in the development

of the National League of Nursing science achievement tests.

Still another limiting factor is that ability, as demonstrated on psychometric tests, can be determined only through the tests which were administered as part of the admission procedure in the Boston University School of Nursing. No attempt has been made to determine if these are the most effective predictive tests possible. What this study wishes to determine is which of the predictive tests seem to have the highest correlation with the achievement test results, and whether or not these correlations have implications for Human Ecology.

Because of the size of the sample and the diversity of the group it is likely that the results will give impressions only. The study should, however, provide the material for further testing of hypothesis with subsequent groups.

Purpose of the Study

The purposes of the study are:

1. To explore methods of testing the stated hypothesis.
2. To identify those factors which serve to prove or disprove the hypothesis as a basis for further study.
3. To determine which of the psychometric tests used best predicts student success in Human Ecology and on the N.L.N. science achievement examinations.

Specific Questions to be Answered

To test the hypothesis it was necessary to obtain answers to the following questions:

In relation to psychometric tests:

1. What are the similarities and differences in potential success as demonstrated on the different psychometric tests used and in the parts of the tests used?
2. If the hypothesis is true, what might be the success expected in Human Ecology?

In relation to achievement tests:

1. What were the composite results obtained on the tests prepared by the faculty of Human Ecology and on the N.L.N. science achievement tests?
2. What are the similarities and differences in results on these two kinds of tests?

In comparing prediction and achievement:

1. In general, what is the relationship between potential ability and achievement?
2. Is there more consistency of agreement demonstrated in correlation between the predictive test and achievement, or between one phase of a predictive test and achievement?
3. Do these results appear to prove or disprove the hypothesis?

No attempt was made to determine other learnings such as ability to work in groups or pairs, to use the problem-solving approach, to relate materials to other situations or to evaluate scientific

literature, since these were not within the scope of this study.

Sources of Data Used

Current literature was explored from 1935-1953 to ascertain what other investigators had found relative to correlation between predictive tests and science achievement. Thirty sources of data were reviewed and the ones that seemed most pertinent to this study are summarized below.

The two predictive tests used in the study were the American Council on Education Psychological Examination (A.C.E.) and the Cooperative Reading Speed and Comprehension Test, Form Two (C_2T). The A.C.E. reports socres in three subtests: a Q or quantitative score, an L or linguistic score, and a "Total" score.[2] The C_2T reports separate scores in speed of reading, and in level or depth of understanding of reading.[3]

Thurstone reported correlation of 0.43--.47 between the A.C.E. and the introductory course in biological sciences.[4] "Total" scores on the A.C.E. are regarded by Crawford and Burnham as a good all-round measure of academic success.[5] Traxler found that the L score on the

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[2]Super, Donald E. Appraising Vocational Fitness, p. 118. New York: Harper and Brothers, 1949.

[3]Cooperative Testing Division Education Testing Service, p. 1. Princeton, New Jersey: Cooperative Testing Division Education Testing Service.

[4]Crawford, Albert B., and Burnham, Paul S. Forecasting College Achievement, p. 96. New Haven: Yale University Press, 1946.

[5]Ibid.

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[5]Ibid.

A.C.E. was a better measure of general ability than was the Q score, although neither appeared to be a superior measure of special aptitudes.[6] Super states that L scores are as satisfactory as Q scores for predicting success in scientific areas.[7]

The Cooperative Reading Comprehension Test is a measure of the thinking processes in reading.[8] The speed of comprehension score represents the rate of comprehension of material whereas level of comprehension scores measures the ability of the student to understand materials of increasing difficulty at a rate which the student chooses to work. A study of level of comprehension scores should provide an indication of the extent to which a student may be handicapped because of faulty mechanics of reading. The Cooperative Test Division reported no correlations between the Cooperative Reading Comprehension Test and achievement in science areas.

Another major source of data was from the students themselves in the form of test scores.

Steps in the Study

1. To carry out the purposes of the study it was necessary to study the results of psychometric tests for each student. The first step was:

   a. To review and tabulate the results of the performance of

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[6] Super, op. cit., p. 118.

[7] Ibid.

[8] Cooperative Test Division Educational Testing Service, p. 1.

each student on the A.C.E. and the C_2T.

b. To tabulate the total scores obtained by each student during the course.

c. To tabulate the results of student achievement on each of the N.L.N. science achievement tests.

2. To test the hypothesis it was necessary:

a. To correlate student performance on the A.C.E. and the C_2T with grades obtained at the end of the course.

b. To correlate the grade obtained by each student at the end of the course with her achievement on the N.L.N. science achievement tests.

c. To correlate the results of student achievement on the A.C.E. and C_2T with the N.L.N. science achievement tests.

3. The next step of the study was to translate the composite scores from the teacher-made examinations from raw scores to percentile rank. The formula $P.R. = \left(\frac{R - \frac{1}{2}}{N}\right)(100)$ was used.[9]

4. After obtaining percentile scores for the course grades, correlations were run between these and the psychometric tests.

5. The fifth step was to run correlations between the results of each of the N.L.N. science achievement tests and prediction scores.

6. The sixth step was to correlate the percentile scores of the course and the percentile scores of each of the N.L.N. science achievement tests.

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[9] Odell, C.W. An Introduction to Educational Statistics, p. 78. New York: Prentice-Hall, Inc., 1946.

7. The final step of the study was to determine what conclusions might be drawn from the findings.

Description of the Correlation

At the outset, the students' records were reviewed. For some reason, of the twenty-two freshmen used in the sample, five had not taken College Entrance Board Examinations. This fact precluded its use as one of the predictive tests against which to correlate achievement.

An examination of the high school grades revealed such a lack of uniformity as to eliminate this source from the study. The A.C.E. and the C_2T were the two predictive tests used in the study to correlate with course grades and achievement on the N.L.N. science achievement examinations, since they were the only tests which had been administered to the total sample, namely, twenty-two freshmen.

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CHAPTER II

PHILOSOPHY

A candidate selecting a college and a program of study hopes to be scholastically successful. Likewise, the faculty of an educational institution should be concerned with admitting those students who can be expected to meet, with reasonable success, the objectives and the accepted standards of achievement. When an educational institution is able to select for admission only those candidates who are most likely to possess the essential aptitudes for successful completion of a program, it is able to use its resources most economically and effectively in helping the students admitted to succeed. Moreover, this practice tends to reduce the emotional trauma which frequently is the result of frustration and failure for those students whose predictions indicate little probability of success.

A professional school has a responsibility to the society which the profession serves, to the profession itself, to the students it admits, and to the higher educational institution of which it is a part. Therefore, it has an added obligation in devising the best predictive measures possible upon which to base predictions for the selection and admission of students. It also has a responsibility to provide the resources necessary to aid those admitted to complete the program effectively and efficiently.

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Colleges and universities offering basic nursing programs are endeavoring to provide the selective process which will eliminate admission of probable failures and to bring into the school those who are able to use its resources to optimum advantage.

Underlying every test score is an attempt to predict. Wherever a test is given, the performance tells something of the differences which exist between individuals. If one tests for an aptitude, one looks for a condition or a set of characteristics which will indicate an individual's ability to perform. By implication when one tests for an aptitude one is looking for a set of characteristics which will enable one person to perform at a different level and to a different degree from another individual. If individuals learn at different rates and at different levels it would seem to indicate that the results of a test for aptitude indicates something which is relatively constant. The result is that one has a relatively sound basis upon which to predict future success. "Whether largely innate or largely acquired, the aptitudes about which we know something appear to become crystallized in early childhood, and after that they are relatively constant."[1]

Unlike the aptitude test, the written achievement test is used to determine what and how much has been learned, how well students can relate materials, and what the level of retention has been over a specified period of time. "The focus is on evaluation of the past without reference to the future, except for the implicit assumption that acquired skills

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[1]Super, op. cit., p. 161.

and knowledge will be useful in their own right in the future."[2]

An aptitude test aids in judging the rapidity and facility with which skills and knowledge will be acquired whereas results on written achievement tests in a given area measures how well the student has been able to attain the level indicated on her predictive tests.

There are certain factors which appear to enter into test scores. The factors referred to will, for the moment, be called prediction factors. These fall into two groups: personal and situational. Under personal factors one can include such things as special traits which are inherent and which make the individual different from all others. Mental ability and emotional stability are examples.

The situational factors are those environmental factors which influence the individual. These include aspects such as his home environment, his socio-economic status, his previous experiences in the community in which he lives, his attitudes, his goals, his drive and depth of interest.

Aptitude may be so affected by drastic and traumatic experiences that even special training cannot overcome the results. When one considers all of the complexities of life, prediction of future performance of an individual or a group of individuals demands the best possible utilization of standardized tests. Even under the best of conditions there are many variable which affect the outcome.

Research in education and psychology has concerned itself with the

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[2] Ibid.

measurement of factors relating to predicting success. As a result of these studies, many types of predictive tests have been developed. All of these use objective questions. The theory is that if predictive tests are objective, the resulting prediction will tend to be more reliable. One of the main problems which confronts the educator, however, results from the incomplete knowledge of all the personal factors which have entered into and affected the results.

Personality, interest, and motivation are not indicated in prediction scores. No method of measuring such factors has been devised which assures reliability. The influence of these factors upon the individual is difficult to measure. Many attempts have been made to determine to what degree student scores have been influenced by such factors. The fallacies of those most commonly used have been pointed out by Spanny.[3] One must never lose sight of the fact that these personal factors have a profound influence on actual performance.

Each college or university and each school or curriculum within it has its own unique goals and accepted achievement standards. Those of the school curriculum must be in accord, however, with those of the parent organization. It is incumbent, therefore, that the faculty periodically reviews the selection process in relation to its reliability in predicting success and in relation to the services it provides to aid those admitted to succeed. Some tests may be more reliable than others in predicting success in one part of the curriculum. A faculty should be

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[3] Spanny, Emma. "Personality Tests and the Selection of Nurses," Nursing Research, 2:4-24, February 1953.

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[3] Spaulding, Ruth. "Personality Tests and the Selection of Nurses," Nursing Research, 2:1-24, February 1953.

well aware of what the tests it uses tells about a candidate and what essential facts these fail to tell relative to wise selection and subsequent sagacious counseling of the student. Such a periodic review should set a scholastic aptitude level below which candidates should be eliminated prior to admission. It should indicate the services which must be given to overcome weaknesses. For instance, if candidates are admitted who demonstrate poor reading ability, remedial reading should begin immediately. Some institutions, lacking this type of service, may prefer that such deficiencies be eliminated before further consideration is given to selection or rejection.

A systematic and periodic review of the selective process and the achievement of the students selected may lead to improvement of selective measures, point out needed changes in the supplemental services provided, indicate alteration of teaching methods and teaching aids, or modify the counseling process. It is the responsibility of the faculty to have selection and services in harmony with each other and consistent with the over-all purposes and obligations of the school and the institution.

Because the Boston University School of Nursing, in 1953-54, put into operation a new course called "Human Ecology," it appeared advisable for future planning to do an analysis of the relationship between the methods of predicting scholastic aptitude and the achievement of freshmen enrolled in the course. In the report which follows the results of this analysis will be presented with proposals for such modifications as

the facts determine, and with suggestions for further studies needed if selection and services are to be adjusted in a desirable manner.

CHAPTER III

METHODOLOGY

To determine the value of the A.C.E. and C_2T as predictive tests in terms of student achievement in "Human Ecology" it was first necessary to review the background of each student. The high school record, the College Entrance Board Examination, the American Council on Education Psychological Examination, and the Cooperative Reading Comprehension Test, Form 2, were reviewed to determine the potential aptitude of each student. Because five of the freshmen had not taken the College Entrance Board Examination it was not possible to use this factor in the study. Also the averages of all high school grades per student failed to provide comparable data. This left only the American Council on Education Psychological Examination and the Cooperative Reading Comprehension Test, Form 2, as the two predictive tests which could finally be used for correlations with the course grades and achievement on the National League for Nursing examinations in Anatomy and Physiology, Microbiology, and Chemistry.

All teacher-made tests which were given throughout the course were assigned a total raw score value. The results of predictive tests and the National League for Nursing science achievement tests were recorded in percentile scores. In order to have comparable measures the total of all raw scores obtained by each student in "Human Ecology" had to be converted to a percentile score. The formula used was

CHAPTER III

METHODOLOGY

$P.R. = \left(\frac{R - \frac{1}{2}}{N}\right)(100)$.*

The total number of students in the class was ninety, but because one sophomore had not yet completed her work at the time this study was done, only eighty-nine students are used as the total number. As previously noted only twenty-two of these were freshmen; the range of scores for the class was from a total of 2132 to 1332. These were tabulated in step intervals of 20 and the frequencies and cumulative frequencies were obtained for the whole class. (See Table I)

Applying the formula $P.R. = \left(\frac{R - \frac{1}{2}}{N}\right)(100)$ the percentile rank was obtained for each student. The freshmen were then separated from the rest of the group. The data concerning the freshmen has been summarized in tabular form with the A.C.E. "Total" percentile score shown in descending rank order. From Table II the corresponding percentile scores in each of the prediction and achievement tests can be noted.

The next step in the study was to determine the coefficients of correlation between the following:

1. A.C.E. Q score and
   a. average percentile class grades
   b. percentile on each of the National League for Nursing science achievement tests.
2. A.C.E. L score and
   a. average percentile class grades

---

*R = Rank
N = Number
P.R. = Percentile Rank

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P.R. = Percentile Rank

TABLE I

PERCENTILE RANK FOR CUMULATIVE GRADE SCORES
IN HUMAN ECOLOGY

Class Interval (Raw Scores)	Frequency			Cumulative Frequency	Percentile
	Freshmen	Others	Total		
2132-2113	0	1	1	89	99
2112-2093	0	2	2	88	98
2092-2073	0	1	1	86	95
2072-2053	0	0	0	85	95
2052-2033	0	2	2	83	93
2032-2013	0	0	0	83	93
2012-1993	0	1	1	83	93
1992-1973	0	3	3	82	92
1972-1953	0	1	1	79	89
1952-1933	0	1	1	78	88
1932-1913	1	0	1	77	87
1912-1893	1	1	2	76	86
1892-1873	0	2	2	74	83
1872-1853	1	2	3	72	80
1852-1833	0	2	2	69	77
1832-1813	1	2	3	67	75
1812-1793	0	3	3	64	71
1792-1773	1	2	3	61	67
1772-1753	1	5	6	58	65
1752-1733	0	2	2	52	58
1732-1713	1	2	3	50	55
1712-1693	0	1	1	47	52
1692-1673	0	1	1	46	51
1672-1653	2	3	5	45	50
1652-1633	3	2	5	40	44
1632-1613	1	3	4	35	39
1612-1593	0	3	3	31	34
1592-1573	0	4	4	28	31
1572-1553	1	2	3	24	31
1552-1533	4	2	6	21	26
1532-1513	1	5	6	15	23
1512-1493	0	3	3	9	16
1492-1473	0	1	1	6	9
1472-1453	1	1	2	5	6
1452-1433	1	1	2	3	3
1432-1413	0	0	0	1	
1412-1393	0	0	0	1	
1392-1373	0	0	0	1	
1372-1353	0	0	0	1	
1352-1333	0	0	0	1	
1332-1313	1	0	1	1	1

Source: Students' records.

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IN HUMAN ECOLOGY

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	Freshmen	Others	Total		
2139-2119	0	1	1	89	99
2119-2099	0	2	2	88	98
2099-2079	0	1	1	86	95
2079-2059	0	0	0	85	95
2059-2039	0	2	2	83	93
2039-2019	0	0	0	83	93
2019-1999	0	1	1	83	93
1999-1979	0	3	3	82	92
1979-1959	0	1	1	79	89
1959-1939	0	1	1	78	88
1939-1919	1	0	1	77	87
1919-1899	1	1	2	76	86
1899-1879	0	2	2	74	83
1879-1859	1	2	3	72	80
1859-1839	0	2	2	69	77
1839-1819	1	2	3	67	75
1819-1799	0	3	3	64	71
1799-1779	1	2	3	61	67
1779-1759	1	5	6	58	65
1759-1739	0	2	2	52	58
1739-1719	1	2	3	50	55
1719-1699	0	1	1	47	52
1699-1679	0	1	1	46	51
1679-1659	2	3	5	45	50
1659-1639	3	2	5	40	44
1639-1619	1	3	4	35	39
1619-1599	0	3	3	31	34
1599-1579	0	4	4	28	31
1579-1559	1	2	3	24	31
1559-1539	4	2	6	21	26
1539-1519	1	5	6	15	23
1519-1499	0	3	3	9	16
1499-1479	0	1	1	6	9
1479-1459	1	1	2	5	6
1459-1439	1	1	2	3	5
1439-1419	0	0	0	1	
1419-1399	0	0	0	1	
1399-1379	0	0	0	1	
1379-1359	0	0	0	1	
1359-1339	0	0	0	1	
1339-1319	1	0	1	1	1

Source: Students' records.

b. percentile on each of the National League for Nursing science achievement tests.

3. A.C.E. "Total" score and
   a. average percentile class grades
   b. percentile on each of the National League for Nursing science achievement tests.
4. Speed of reading on the C_2T and average percentile class grades.
5. Level of reading on the C_2T and
   a. average percentile class grades
   b. percentile on each of the National League for Nursing science achievement tests.

The final step of the study was to determine the coefficients of correlation between each of the three National League for Nursing science achievement tests and the average percentile class grades.

To determine the coefficient of correlation the Ayer method of assumed mean was used. The formula:[1]

$$r = \frac{\frac{\Sigma XY}{N}}{\sigma X \sigma Y}$$

The correlation table was set up in the form of a double entry. For one series of scores the scale was laid off on an X or horizontal axis. The scale for the other series of test scores was laid off on the Y or vertical axis. Scores were tallied for each pair of scores. Deviations were assigned and the classes started with number 1 and

---

[1] Odell, op. cit., p. 76.
r = coefficient of correlation
X and Y = one deviation of measure from their mean
Σ = sum of
N = number
σ = standard deviation

TABLE II

PERCENTILE SCORES[a] FROM PRE-ENTRANCE, ACHIEVEMENT TESTS, AND CUMULATIVE GRADES IN HUMAN ECOLOGY

Student[b]	A.C.E.			C_2T		N.L.N. Science Achievement Test			Grades in Human Ecology
	Q	L	"Total"[c]	Speed	Level	Chem.	Micro.	Anat. & Phys.	
B	99	79	95	85	63	88	91	84	75
V	83	93	93	75	73	48	12	55	16
L	80	91	91	67	27	69	66	53	55
J	80	86	87	83	54	85	58	67	86
R	66	75	73	29	27	30	28	23	23
S	96	34	66	45	49	53	19	13	23
O	80	54	66	67	37	51	42	63	23
K	56	64	61	67	54	77	69	82	39
I	70	44	57	60	37	69	55	63	65
E	74	37	51	53	59	67	42	31	44
F	86	25	49	26	27	53	89	78	87
N	83	23	46	18	22	41	16	42	44
T	89	19	46	14	18	67	6	33	50
M	59	23	35	49	71	51	23	27	3
Q	63	61	35	26	32	28	11	65	50
D	31	39	33	60	77	75	75	55	67
A	48	25	30	41	59	53	11	35	30
P	24	42	30	64	43	67	61	20	6
C	56	18	29	16	15	77	36	23	44
G	28	29	26	67	54	97	58	69	80
H	37	12	19	10	8	60	8	27	23
U	34	10	16	37	22	30	23	12	1

Source: Students' records.

[a]All scores are recorded in percentile

[b]Letters refer to individual students.

[c]Rank order of A.C.E. "Total" scores.

TABLE 11

PERCENTILE SCORES[a] FROM PRE-ENTRANCE, ACHIEVEMENT TESTS, AND CUMULATIVE GRADES IN HUMAN ECOLOGY

Student[b]	A.C.E.			G_2T		M.L.H. Science Achievement Test			Grades in Human Ecology
	Q	L	Total[c]	Speed	Level	Chem.	Micro.	Anat. & Phys.	
B	99	79	95	85	63	88	91	84	75
V	83	93	93	75	73	48	12	55	16
L	80	91	91	67	27	69	65	53	55
J	60	86	87	83	54	85	58	67	86
R	66	75	73	29	27	30	28	23	23
S	56	34	66	45	49	53	19	13	23
O	80	54	66	67	37	51	42	63	23
K	56	64	61	67	54	77	69	82	37
I	70	44	57	60	37	69	55	63	65
E	74	37	31	33	59	67	42	31	44
F	86	25	49	26	27	53	89	78	87
N	83	23	16	18	22	41	16	42	44
T	89	19	46	14	18	87	6	33	50
M	57	23	35	49	72	51	23	27	3
Q	63	21	25	26	32	28	11	65	50
U	31	39	33	60	77	79	79	55	67
A	48	25	30	41	59	53	11	35	30
P	24	42	30	64	43	67	61	20	0
C	56	18	29	16	15	77	36	23	44
G	28	29	26	67	54	97	58	69	80
H	37	12	19	10	8	60	8	27	23
D	34	10	16	37	22	30	23	12	1

Source: Students' records.

[a]All scores are recorded in percentile

[b]Letters refer to individual students.

[c]Rank order of A.C.E. "Total" scores.

increased by one per class until the largest number equalled the total number of classes. (See Appendix.)

Work was done in terms of deviations and expressed in intervals. Computation was done for correction of the standard deviation. By using the above method the coefficient of correlation was found between the A.C.E. Q score, L score, and "Total" scores and the course grade, a coefficient of correlation was determined between the course grade and the N.L.N. science achievement tests, and a coefficient of correlation was determined between the results of the predictive test and the results of the N.L.N. science achievement tests.

The correlation "r" may take any value from -1.00 to +1.00. If the student's standing in one test corresponds exactly with her standing in another test the correlation is +1.00. One could then perfectly predict the results of one test from the other. If, on the other hand, two variables are completely unrelated, the correlation will be near zero. For example, in this study correlations of 0.71, 0.61, and 0.23 show that the degree of relationship is positive, yet not perfect, and some prediction can be made. Correlations over 0.80 are not common and establish a strong positive relationship. A correlation below 0.60 establishes that a positive relationship exists but variables interfere with perfect predictions.

Where there is a zero correlation between two sets of tests it means that prediction by means of the test is no more than an arbitrary guess. As the correlation rises, estimation becomes more accurate.

CHAPTER IV

SUMMARY OF FINDING

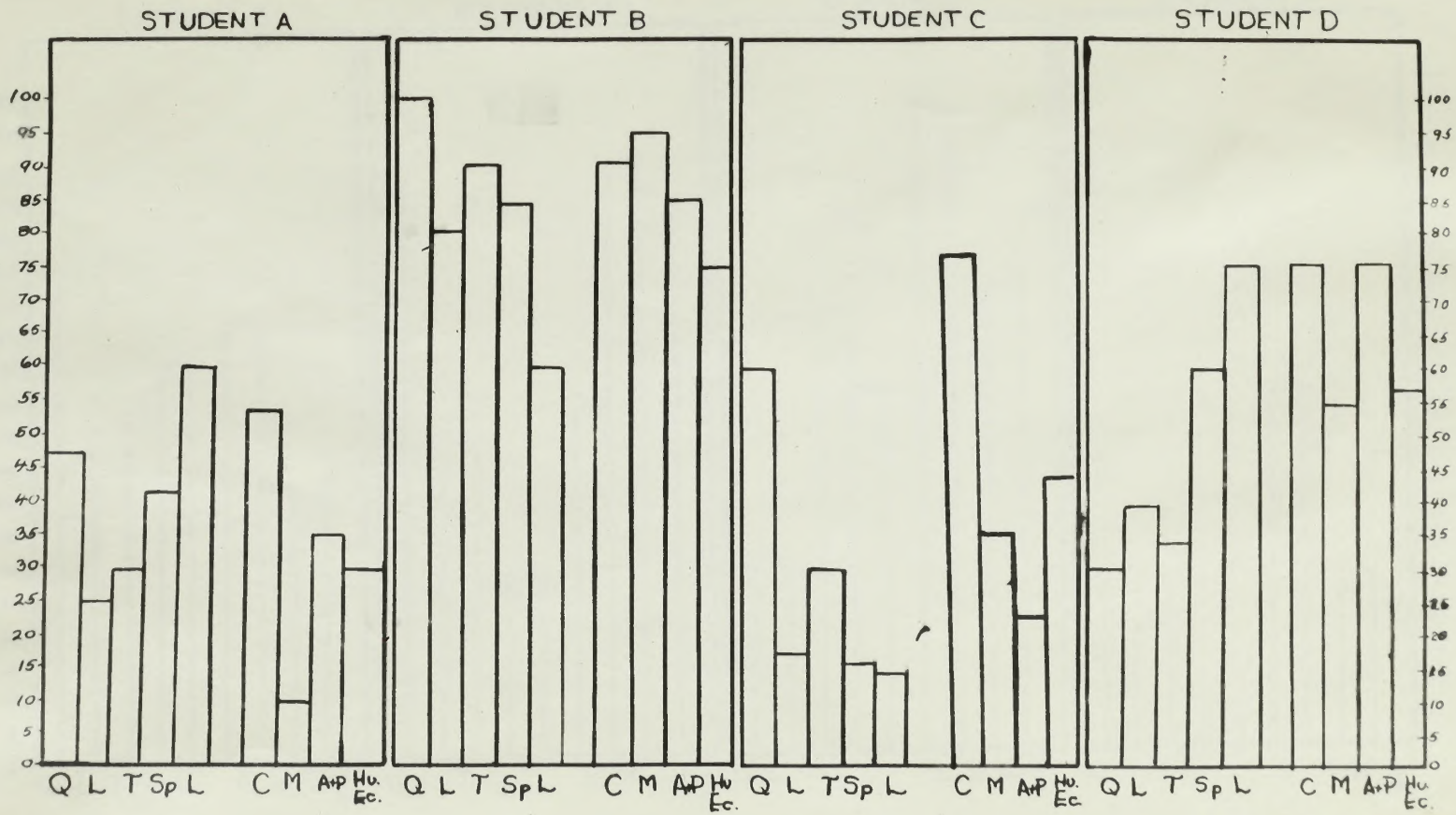
The previous chapter described the method which was used to determine the relationship between certain standardized tests used in selection of students and their achievement in Human Ecology. While it is realized that some standardized tests have greater predictive value for success or failure in certain subject matter areas, if the hypothesis to be tested is true there should be a positive correlation between some phases of these tests and achievement. This chapter will present the relationships shown as a result of correlations.

From Table II can be seen the similarities and differences of percentile scores for all students on all tests. For many of the students there are apparent marked differences in percentiles between the two preentrance tests and between separate parts of these tests, as well as between results on the various achievement tests. These relationships and variables can be seen more clearly in Figure 1 following, in which the predictive percentile scores are represented in graphic form in relation to the various achievement percentile scores for each student included in the sample.

From these it is immediately evident that for 68 per cent of the students there is a positive relationship generally between results on predictive tests and results on achievement tests. For example, students

FIGURE 1

PERCENTILE SCORES OF INDIVIDUAL STUDENTS

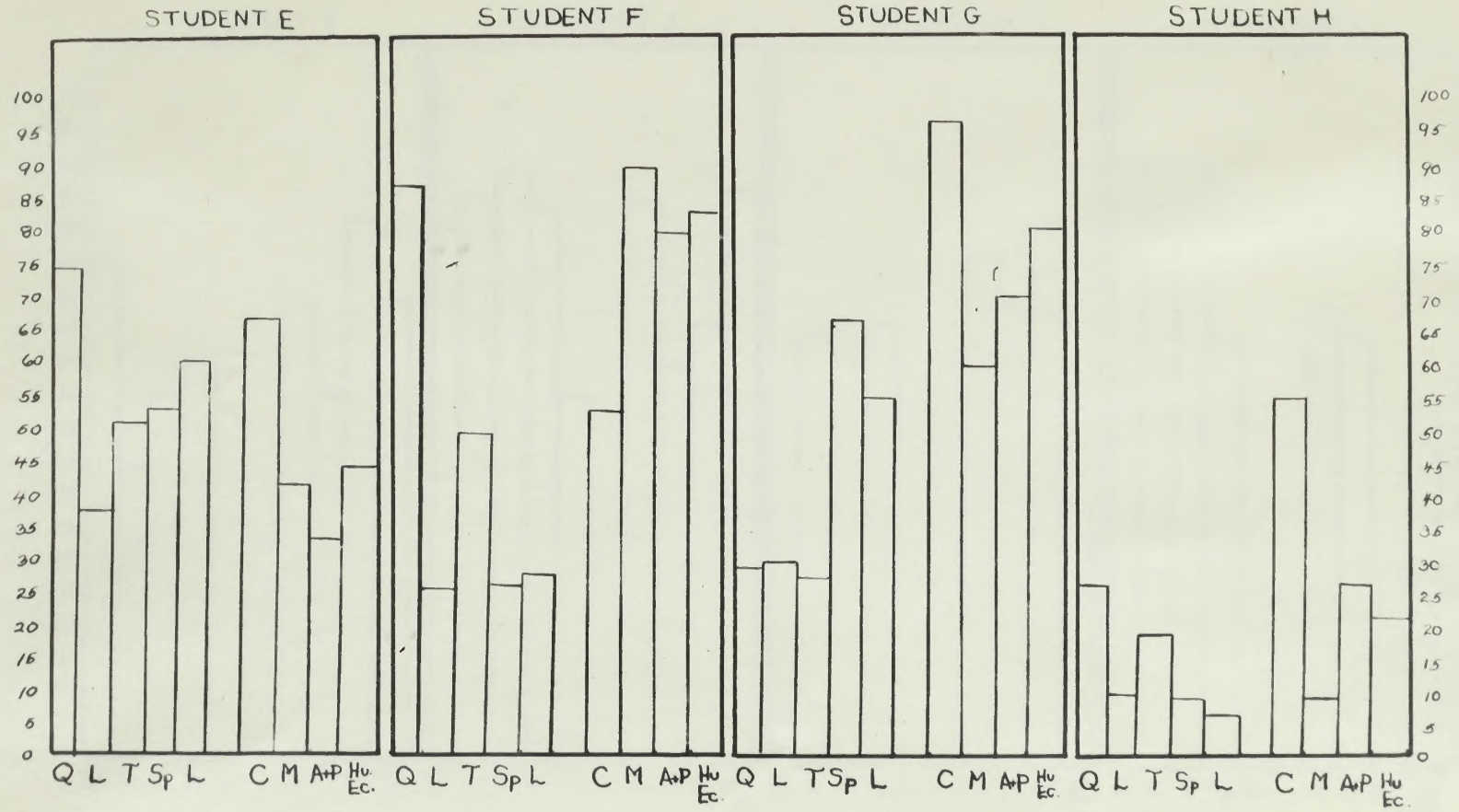


KEY Q = QUANTITATIVE, L = LINGUISTIC, T = TOTAL } A.C.E.

Sp = SPEED, L = LEVEL } C_2T

C = CHEMISTRY
M = MICROBIOLOGY
A+P = ANATOMY AND PHYSIOLOGY
Hu.Ec = HUMAN ECOLOGY.

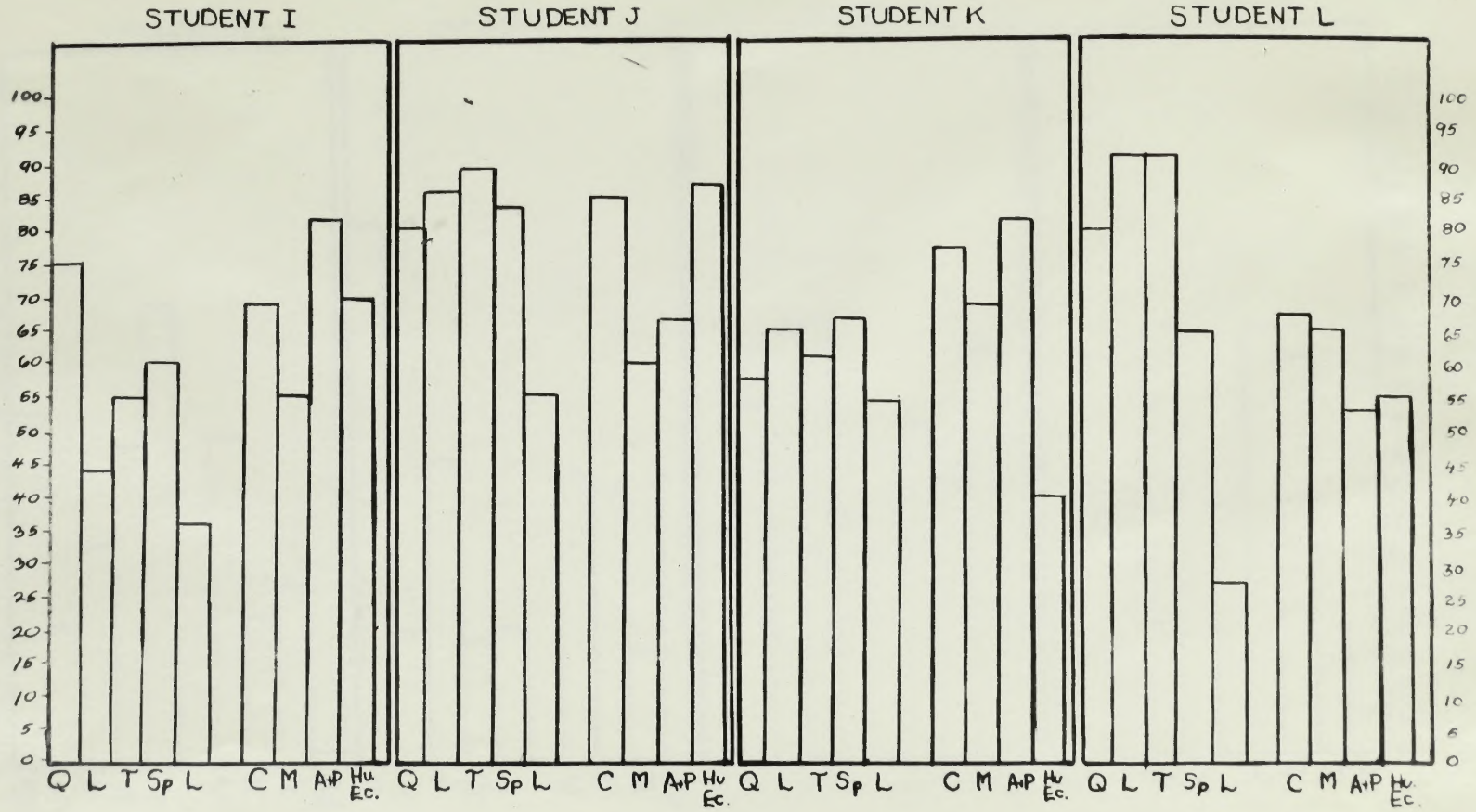
FIGURE 1 (CONT.)
PERCENTILE SCORES OF INDIVIDUAL STUDENTS



KEY Q = QUANTITATIVE, L = LINGUISTIC, T = TOTAL } A.C.E.
Sp = SPEED, L = LEVEL } C.T

C = CHEMISTRY
M = MICROBIOLOGY
A+P = ANATOMY AND PHYSIOLOGY
Hu Ec = HUMAN ECOLOGY

FIGURE I (CONT)
PERCENTILE SCORES OF INDIVIDUAL STUDENTS



KEY Q = QUANTITATIVE, L = LINGUISTIC, T = TOTAL } A.C.E
Sp = SPEED, L = LEVEL } C_2T

C = CHEMISTRY
M = MICROBIOLOGY
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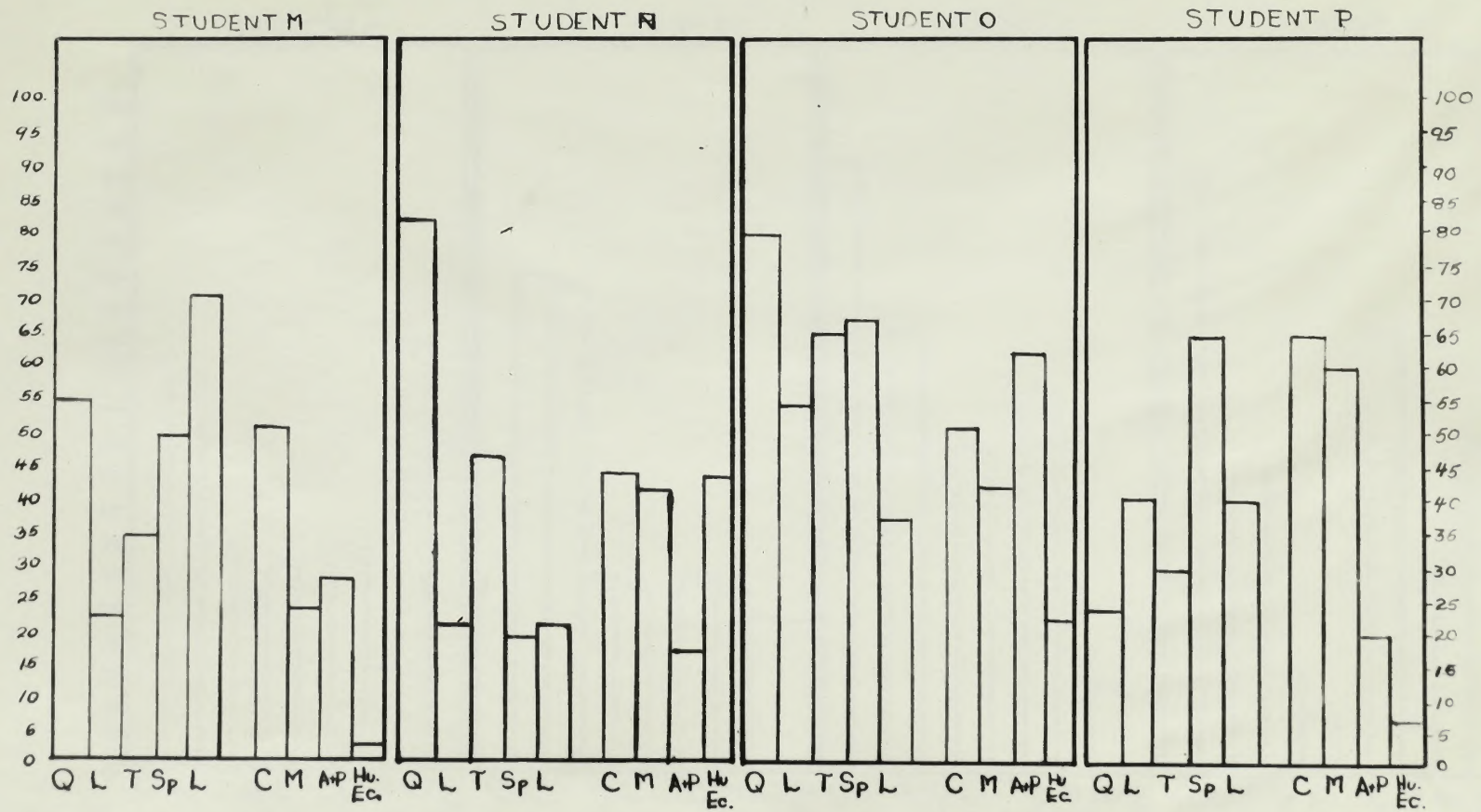
Hu Ec = HUMAN ECOLOGY.

FIGURE 1 (CONT.)
PERCENTILE SCORES OF INDIVIDUAL STUDENTS.



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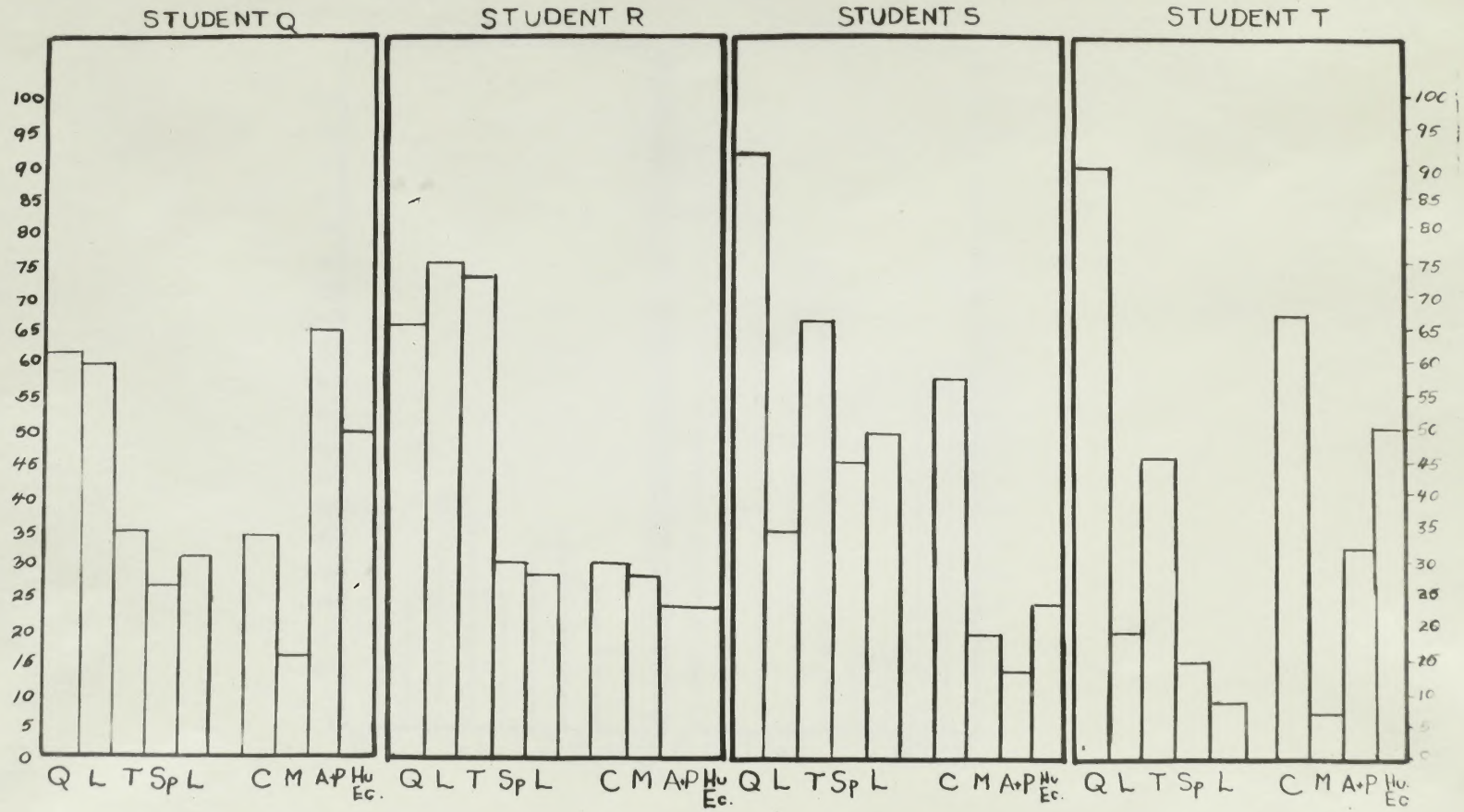
Sp = SPEED, L = LEVEL } C_2T

C = CHEMISTRY
M = MICROBIOLOGY
A+P = ANATOMY AND PHYSIOLOGY
Hu.Ec = HUMAN ECOLOGY.

FIGURE 1 (CONT)

PERCENTILE SCORES OF INDIVIDUAL STUDENTS

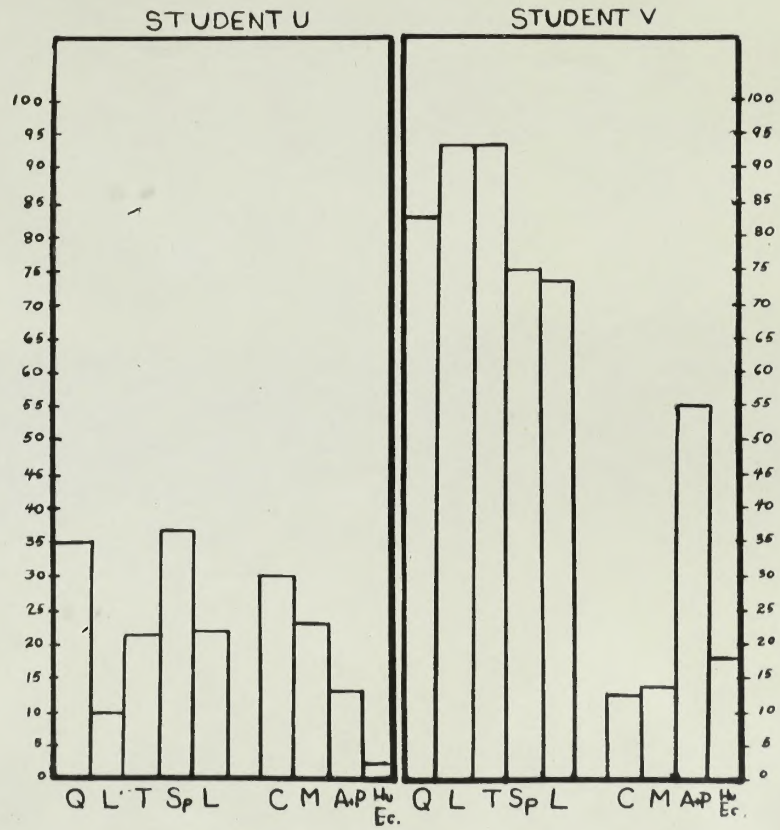


KEY Q = QUANTITATIVE, L = LINGUISTIC, T = TOTAL } A.C.E.

Sp = SPEED, L = LEVEL } C_2T

C = CHEMISTRY
M = MICROBIOLOGY
A+P = ANATOMY AND PHYSIOLOGY
Hu Eo = HUMAN ECOLOGY

FIGURE 1 (CONT.)
PERCENTILE SCORES OF INDIVIDUAL STUDENTS



KEY Q = QUANTITATIVE
L = LINGUISTIC
T = TOTAL
} A.C.E.

Sp = SPEED
L = LEVEL
} C.T

C = CHEMISTRY
M = MICROBIOLOGY
A+P = ANATOMY AND PHYSIOLOGY
Hu Ec = HUMAN ECOLOGY

B and J achieved at a consistently high level on predictive test scores, achievement test scores, and in Human Ecology. Students H and U achieved at a consistently low level on predictive test scores, achievement test scores, and Human Ecology.

To further refine the uses of these data, correlations were obtained between each of the scores on the pre-entrance tests and each of the achievement scores on the three National League for Nursing examinations, and between each of the course percentile scores and each of the National League for Nursing science test scores. The correlation work sheets will be found in Appendix A.

When these correlations were examined the following facts were noted between pre-entrance scores and achievement tests:

1. With respect to A.C.E. Q scores
   a. There was a correlation of 0.11 between Q scores and course grades.
   b. 73 per cent of the freshmen were above the fiftieth percentile on the Q scores.
   c. 32 per cent were above the fiftieth percentile on both the Q score and course grades.
   d. There was a correlation of -0.11 between Q scores and the N.L.N. chemistry achievement scores.
   e. 55 per cent of the students were above the fiftieth percentile on the A.C.E. Q scores and the N.L.N. chemistry scores.
   f. There was a correlation of 0.57 between the A.C.E. Q score and the N.L.N. microbiology scores.

g. 27 per cent of the freshmen were above the fiftieth percentile on the A.C.E. and the N.L.N. microbiology examination.

h. There was a correlation of 0.23 between the A.C.E. Q scores and the N.L.N. anatomy and physiology examination.

i. 41 per cent of the freshmen were above the fiftieth percentile on both scores.

2. Regarding the L score and the A.C.E.:

a. The correlation between the L score of the A.C.E. and course grades was 0.22.

b. 36 per cent of the freshmen were above the fiftieth percentile on the A.C.E. L score.

c. 17 per cent were above the fiftieth percentile on both the "Total" A.C.E. scores and course grades.

d. There was a correlation of 0.054 between the L scores of the A.C.E. and the N.L.N. chemistry scores.

e. 23 per cent were above the fiftieth percentile on both sets of test scores.

f. There was a correlation of 0.32 between the L scores of the A.C.E. and the N.L.N. microbiology scores.

g. 17 per cent of the freshmen were above the fiftieth percentile on the A.C.E. L scores and on the N.L.N. microbiology examinations.

h. There was a correlation of 0.46 between the L scores of the A.C.E. and the N.L.N. anatomy and physiology scores.

i. 32 per cent of the freshmen were above the fiftieth percentile on the A.C.E. L scores and the N.L.N. anatomy and physiology

scores.

3. With respect to "Total" A.C.E. scores:
   a. There was a correlation of a 0.21 between the A.C.E. "Total" scores and course grades.
   b. 50 per cent of the freshmen were above the fiftieth percentile on the "Total" A.C.E. scores.
   c. 18 per cent of the students were above the fiftieth percentile on the A.C.E. "Total" scores and in the course grades.
   d. There was a correlation of 0.14 between the "Total" A.C.E. scores and the N.L.N. chemistry scores.
   e. 36 per cent of the freshmen were above the fiftieth percentile on the A.C.E. "Total" and on the N.L.N. chemistry scores.
   f. There was a correlation of 0.29 between the "Total" A.C.E. and the N.L.N. microbiology scores.
   g. 27 per cent of the freshmen were above the fiftieth percentile on the "Total" A.C.E. and on the microbiology tests.
   h. There was a correlation of 0.49 between the "Total" A.C.E. and the N.L.N. anatomy and physiology scores.
   i. 32 per cent of the freshmen were above the fiftieth percentile on the "Total" A.C.E. and the N.L.N. anatomy and physiology scores.
4. With respect to the speed of reading on the C_2T:
   a. There was a correlation of 0.016 between the speed of reading scores on the C_2T and the course grades.
   b. 50 per cent of the freshmen were above the fiftieth percentile

on the speed of reading scores.

c. 23 per cent of the freshmen were above the fiftieth percentile on the speed of reading scores and the course grades.

d. 45 per cent of the freshmen were above the fiftieth percentile on the speed of reading and the N.L.N. chemistry scores.

e. 36 per cent of the freshmen were above the fiftieth percentile on the speed of reading and the N.L.N. microbiology scores.

f. 41 per cent of the freshmen were above the fiftieth percentile on the speed of reading and the N.L.N. anatomy and physiology scores. The correlation between the speed of reading and the course grades was so low that no further correlations were done between these prediction scores and the three N.L.N. achievement scores.

5. Regarding the level of reading on the C_2T:

a. There was a correlation of 0.052 between the level of reading scores and the course grades.

b. 41 per cent of the freshmen were above the fiftieth percentile on the level of reading scores.

c. 18 per cent of the freshmen were above the fiftieth percentile on the level of reading scores and in course grades.

d. There was a correlation of 0.29 between level of reading scores and the N.L.N. chemistry scores.

e. 41 per cent of the freshmen were above the fiftieth percentile on the N.L.N. chemistry scores and the C_2T level of reading.

f. There was a correlation of 0.30 between the level of reading

scores and the N.L.N. microbiology scores.

g. 23 per cent of the freshmen were above the fiftieth percentile on the N.L.N. microbiology test scores and the C_2T level of reading.

h. There was a correlation of 0.27 between the level of reading and the N.L.N. anatomy and physiology scores.

i. 27 per cent of the freshmen were above the fiftieth percentile on the level of reading scores and on the N.L.N. anatomy and physiology scores.

The per cent of freshmen above the fiftieth percentile on predictive and achievement tests is summarized in tabular form in Table III and the per cents which lie below the fiftieth percentile are found in Table IV.

Another way of looking at these data is shown on Table V in which the correlations on each test are shown in relation to course standing for each of the N.L.N. achievement examinations. It can be seen that the Q score has a fairly reliable correlation with the N.L.N. microbiology achievement results and only a fair correlation with the N.L.N. anatomy and physiology examination. The correlation with the course grades is insignificant and it is negative for the N.L.N. chemistry examination.

The L score on the A.C.E. reveals a fairly reliable correlation for predictive value for achievement on the N.L.N. anatomy and physiology examination and it is slightly less reliable for predicting achievement on the N.L.N. microbiology examination. The correlation with the course grade is only fair, while the correlation with the N.L.N. chemistry achievement examination is insignificant.

TABLE III

PER CENT OF FRESHMEN ABOVE THE FIFTIETH PERCENTILE ON PREDICTIVE TESTS, ACHIEVEMENT TESTS, AND IN HUMAN ECOLOGY

Test	A.C.E.			C_2T		N.L.N.			Course Grade
	Q Score	L Score	Total	Level	Speed	Chem.	Micro.	Anat. & Phys.	
A.C.E. Q Score	73	--	--	--	--	55	27	41	32
L Score	--	36	--	--	--	23	17	32	18
A.C.E. Total	--	--	50	--	--	36	27	32	18
C_2T Speed	--	--	--	--	50	45	36	41	23
Level	--	--	--	41	--	41	23	27	18
N.L.N. Chem.	--	--	--	--	--	77	--	--	--
Micro.	--	--	--	--	--	--	41	--	--
Anat. & Phys.	--	--	--	--	--	--	--	50	--
Course Grade	--	--	--	--	--	--	--	--	41

Source: Students' records.

TABLE IV

PER CENT OF FRESHMEN BELOW THE FIFTIETH PERCENTILE ON PREDICTIVE TESTS, ACHIEVEMENT TESTS, AND IN HUMAN ECOLOGY

Test	A.C.E.			C_2T		N.L.N.			Course Grade
	Q Score	L Score	"Total"	Level	Speed	Chem.	Micro.	Anat.& Phys.	
A.C.E. Q Score	27	--	--	--	--	5	18	14	18
L Score	--	64	--	--	--	9	41	45	41
A.C.E. Total	--	--	55	--	--	14	36	36	32
C_2T Speed	--	--	--	--	50	14	45	36	36
Level	--	--	--	59	--	18	41	36	36
N.L.N. Chem.	--	--	--	--	--	23	--	--	--
Micro.	--	--	--	--	--	--	59	--	--
Anat.& Phys.	--	--	--	--	--	--	--	50	--
Course Grade	--	--	--	--	--	--	--	--	59

Source: Students' records.

Test	A.C.E.				C2T		N.L.M.			Course Grade
	Q Score	L Score	Total		Level	Speed	Chmo.	Micro.	Anal. & Phys.	
A.C.E. Q Score	27	—	—	—	—	—	5	18	14	18
L Score	—	64	—	—	—	—	9	42	45	42
A.C.E. Total	—	—	55	—	—	—	14	36	30	32
C2T Speed	—	—	—	—	30	14	42	36		
Level	—	—	—	59	—	18	42	36		
N.L.M. Chmo.	—	—	—	—	—	—	22	—	—	—
Micro.	—	—	—	—	—	—	—	49	—	—
Anal. & Phys.	—	—	—	—	—	—	—	—	30	—
Course Grade	—	—	—	—	—	—	—	—	—	59

Source: Students' records.

TABLE V

COEFFICIENT OF CORRELATION BETWEEN RESULTS OF TESTS USED IN HUMAN ECOLOGY AND PRE-ENTRANCE EXAMINATIONS AND ACHIEVEMENT TESTS

Pre-Entrance Tests	Course Standing	N.L.N. Science Achievement Tests		
		Chem.	Micro.	Anat.& Phys.
A.C.E. Q score	r = 0.11	-0.11	0.57	0.23
A.C.E. L score	r = 0.21	0.054	0.32	0.46
A.C.E. "Total" score	r = 0.21	0.14	0.29	0.49
C_2T Speed of reading	r = 0.016	--	--	--
C_2T Level of reading	r = 0.052	0.29	0.30	0.27

Source: Students' records.

The "Total" A.C.E. score has a fairly high correlation value with the N.L.N. anatomy and physiology examination and a fair degree of correlation with the N.L.N. microbiology examination and course grades. The correlation with the N.L.N. chemistry examination is insignificant.

The correlation between the speed of reading on the C_2T and the course grades is so low as to be insignificant. No further correlations were run between the scores on the speed of reading and the N.L.N. science achievement tests.

The level of reading scores on the C_2T has a fair correlation with the three N.L.N. achievement tests. The correlation with the course standing was so low that it was considered insignificant.

Pre-Entrance Tests	Course Standing	W.L.W. Science Achievement Tests		
		Chem.	Micro.	Anat. & Phys.
A.C.E. Q score	$r = 0.11$	-0.11	0.37	0.29
A.C.E. L score	$r = 0.21$	0.054	0.32	0.46
A.C.E. "Total" score	$r = 0.21$	0.14	0.29	0.47
O_2T Speed of reading	$r = 0.016$	--	--	--
O_2T Level of reading	$r = 0.052$	0.27	0.30	0.27

Source: Students' records.

The "Total" A.C.E. score has a fairly high correlation value with the W.L.W. anatomy and physiology examination and a fair degree of correlation with the W.L.W. microbiology examination and course grades. The correlation with the W.L.W. chemistry examination is insignificant.

The correlation between the speed of reading on the O_2T and the course grades is so low as to be insignificant. No further correlations were run between the scores on the speed of reading and the W.L.W. science achievement tests.

The level of reading scores on the O_2T has a fair correlation with the three W.L.W. achievement tests. The correlation with the course standing was so low that it was considered insignificant.

In Table VI are the correlations which were found between the N.L.N. achievement tests scores and course grades. There is a good correlation between all the N.L.N. achievement examinations and the course grades, but the highest correlation exists between the N.L.N. anatomy and physiology examination and achievement in Human Ecology.

TABLE VI

COEFFICIENT OF CORRELATION BETWEEN N.L.N. ACHIEVEMENT TEST SCORES AND COURSE GRADES

N.L.N. Test	Course Grade
Anatomy and physiology	r = 0.71
Microbiology	r = 0.61
Chemistry	r = 0.56

Source: Students' records.

Another method of observing the data is demonstrated in Table VII in which is shown the correlation of individual student's standing in relation to others of the group. When noting this correlation it was found that there was a good correlation for 27 per cent of the students between predictive scores and scores obtained on achievement tests and in Human Ecology. There was fair correlation for 41 per cent of the freshmen and poor or negative correlation between predictive scores and achievement for 32 per cent of the group.

In Table VI are the correlations which were found between the N.L.N. achievement tests scores and course grades. There is a good correlation between all the N.L.N. achievement examinations and the course grades, but the highest correlation exists between the N.L.N. anatomy and physiology examination and achievement in Human Ecology.

TABLE VI

COEFFICIENT OF CORRELATION BETWEEN N.L.N. ACHIEVEMENT TEST SCORES AND COURSE GRADES

N.L.N. Test	Course Grade
Anatomy and physiology	r = 0.71
Microbiology	r = 0.61
Chemistry	r = 0.56

Source: Students' records.

Another method of observing the data is demonstrated in Table VII in which is shown the correlation of individual student's standing in relation to others of the group. When noting this correlation it was found that there was a good correlation for 27 per cent of the students between predictive scores and scores obtained on achievement tests and in Human Ecology. There was fair correlation for 41 per cent of the freshmen and poor or negative correlation between predictive scores and achievement for 32 per cent of the group.

TABLE VII

CORRELATION OF INDIVIDUAL STUDENT STANDING IN RELATION TO THE GROUP ON PREDICTIVE AND ACHIEVEMENT SCORES

Student	Pre-Entrance Tests					N.L.N. Achievement Tests			Course Grades
	A.C.E.			C_2T					
	L*	Q	"Total"	Speed	Level	Chem.	Micro.	Anat. & Phys.	
				Good Correlations					
L.	2	7	3	4	11	6	5	10	7
B.	4	1	1	1	4	2	1	1	4
I.	9	9	8	6	9	6	8	2	6
N.	16	6	11	14	12	12	14	11	9
H.	19	15	17	17	14	8	17	15	12
U.	20	16	18	10	12	13	12	19	16
				Fair Correlations					
J.	3	7	4	2	6	3	7	6	2
R.	5	10	5	12	11	13	11	16	12
Q.	7	17	12	13	10	14	15	7	8
O.	8	7	6	4	9	10	9	8	12
D.	11	17	13	6	1	5	3	9	5
E.	12	8	9	7	5	7	9	14	9
A.	15	14	14	10	5	9	16	12	11
M.	16	12	12	8	3	10	12	15	15
C.	18	13	15	10	13	4	10	16	9
				Poor Correlations					
V.	1	5	2	3	2	11	15	9	13
K.	6	13	7	4	6	4	4	3	10
D.	10	19	14	5	8	7	6	17	14
S.	13	2	6	9	7	9	13	18	12
G.	14	18	16	4	6	1	7	5	3
F.	15	4	10	13	11	9	2	4	1
T.	17	3	11	16	14	7	18	13	8

*In rank order from high to low of L scores.

Student	Pre-Entrance Tests					Course Grades
	A.S.T.			Q&T		N.L.N. Achievement Tests			
	I.*	Q	"Total"	Speed	Level	Chem.	Micro.	Anat. & Phys.	
Good Correlations									
L.	2	7	3	4	12	6	5	10	7
B.	4	1	1	1	4	2	1	1	4
I.	9	7	8	5	7	6	8	2	6
W.	10	6	11	14	12	12	14	11	9
H.	17	15	17	17	14	8	17	15	12
U.	20	16	18	10	12	13	12	13	15
Fair Correlations									
A.	3	7	4	2	6	3	7	6	2
R.	5	10	5	12	11	15	11	16	12
W.	7	17	12	13	10	14	15	7	8
O.	8	7	6	4	9	10	9	8	12
D.	11	17	13	6	1	5	3	9	5
S.	12	8	9	7	3	7	6	14	9
A.	15	14	14	10	9	9	16	12	11
M.	16	12	12	8	5	10	12	15	15
O.	18	13	15	10	13	4	10	16	9
Poor Correlations									
V.	1	3	2	3	2	11	15	9	13
K.	6	13	7	4	6	4	4	3	10
U.	10	13	14	5	8	7	6	17	14
S.	13	2	6	9	7	9	13	18	12
O.	14	18	16	4	6	1	7	5	3
F.	15	4	10	13	11	3	2	4	1
T.	17	5	11	16	14	7	18	13	8

*In rank order from high to low of I scores.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

This study attempted to prove the hypothesis that there is a positive relationship between scores on the pre-entrance tests and achievement. This was done by comparing the scores of twenty-two freshmen on two pre-entrance tests with their achievement in Human Ecology.

The best single predictor appeared to be the "Total" score on the A.C.E. as can be seen on Tables II and VII. The student standing on the "Total" A.C.E. score is comparable to her standing in the class and on the three N.L.N. science achievement examinations.

The score on the A.C.E. pre-entrance test also appears to have some predictive value for achievement in Human Ecology and on the N.L.N. anatomy and physiology and microbiology examinations. Observing the student standing on Tables II and V one can readily see the fairly good correlation which exists between individual student performances on the L score of the A.C.E. and the course grades and the National League for Nursing science achievement examinations.

Of the three National League for Nursing science achievement examinations, the highest coefficient of correlation was obtained between the anatomy and physiology examination and the scores in Human Ecology. All of the tests, however, showed very positive correlations with the achievement in the course Human Ecology. The positive relationship which existed

between the N.L.N. achievement test scores and course grades would seem to indicate that high performance by students in the course would be reason to feel these same students should achieve at a comparable level on the N.L.N. science achievement examinations. As can be seen on Tables II and VII generally, students who fell below the fiftieth percentile in the course did comparable work on the achievement tests. This close correlation appears to indicate the existence of a meaningful relationship between achievement test scores.

There is some positive relationship between the pre-entrance test results and achievement test scores. Of themselves, they do not appear to be sufficiently discriminating to be used to set the lower limits for selection of students without a further study of a larger sample.

Generally those students who were above the fiftieth percentile on the A.C.E. L score and "Total" score were capable of maintaining a similar standing on the N.L.N. science achievement examinations and in Human Ecology.

There was a fairly reliable correlation between predictive test scores and achievement for 68 per cent of the freshmen class. It would therefore seem that these tests do have some predictive value, though it is not high. Had the size of the sample been larger this number of students with high correlations may have increased.

Recommendations

On the basis of these findings it is recommended that:

1. A follow-up study be done with the freshmen group in Human Ecology this coming year.

Although the results appear to confirm the hypothesis, the size of the sample is too small to reach a determination of predictive level on pre-entrance tests from which a wiser selection might be made.

2. Further information should be obtained on the personal characteristics which would aid in counseling of the student selected.

   There was no way of knowing why students who performed high on predictive tests achieved at a low level in Human Ecology. More needs to be learned about motivation, study habits, etc.

3. All students should be urged to see their designated counselor in Human Ecology at least once a month.

   The frequent contact with the counselor would better enable the instructors to know the student. As a result existing problems would be recognized more rapidly and the necessary guidance would be given at a time when the student was most ready to receive help.

4. There has been no attempt made to determine if the predictive tests used are the best tests for selection of students for Human Ecology.

   Observation of linguistic ability and achievement requires much reading and interpretation. While the tests used failed to have a high correlation, a definite correlation was present.

Therefore, low scores may be an indication for the requirement of remedial reading.

5. Other predictive tests should be investigated by the faculty to find tests with higher predictive values for science courses.

The results of other investigators have revealed the existence of tests with higher correlation with science courses. Human Ecology carries high credits for a year course and it requires a larger number of potentially successful candidates.

BIBLIOGRAPHY

Cooperative Testing Division Education Testing Service. Princeton, New Jersey: Cooperative Testing Division Education Testing Service. 4 pp.

Corning, Hobart M. After Testing--What? The Practical Use of Test Results in One School System. Chicago: Scott, Foresman and Company, 1926. 213 pp.

Crawford, Albert B., and Burnham, Paul S. Forecasting College Achievement. New Haven: Yale University Press, 1946. xx + 291 pp.

Cronbach, Lee J. Essentials of Psychological Testing. New York: Harper and Brothers, 1949. xiii + 454 pp.

Greene, Harry A., Jorgenson, Albert N., and Gerberich, J. Raymond. Measurement and Evaluation in the Secondary School. Revised edition. New York: Longmans, Green and Company, 1951. vi + 634 pp.

Odell, C. W. An Introduction to Educational Statistics. New York: Prentice-Hall, Inc., 1946. 269 pp.

Sears, Jesse B. The Nature of the Administrative Process. New York: McGraw-Hill Book Company, Inc., 1950. xi + 574 pp.

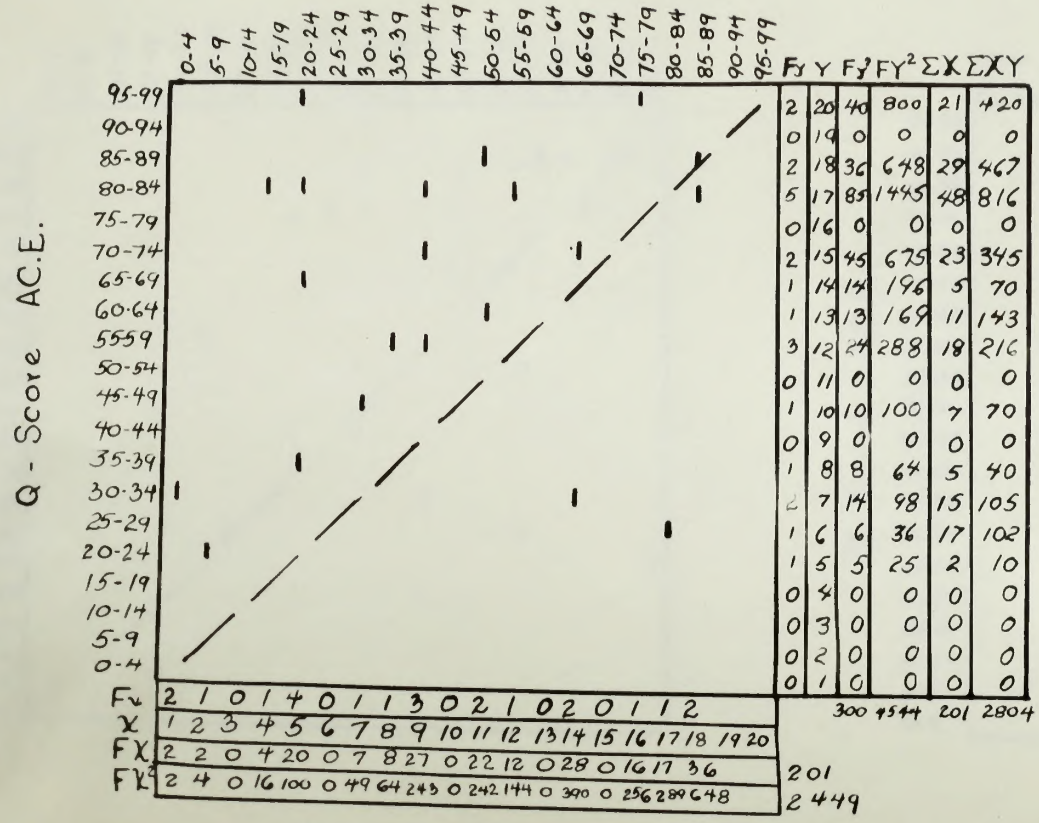
Skinner, Charles E. Educational Psychology. Third edition. New York: Prentice-Hall, Inc., 1951. vi + 774 pp.

Spanny, Emma. "Personality Tests and the Selection of Nurses," Nursing Research, 2:4-24, February 1953.

Super, Donald E. Appraising Vocational Fitness. New York: Harper and Brothers, 1949. xxi + 663 pp.

APPENDIX

Percentile Grade Score



$$C_x = \frac{201}{22} = 9.136 \qquad C_y = \frac{300}{22} = 13.636$$

$$S^2x = \frac{2449}{22} = 111.3181 \qquad S^2y = \frac{4544}{22} = 206.6090$$

$$C^2x = 83.4664 \quad C^2y = 185.9404$$

$$\sigma^2x = 27.7517 \quad \sigma^2y = 20.6090$$

$$\sigma x = 5.123 \quad \sigma y = 4.539$$

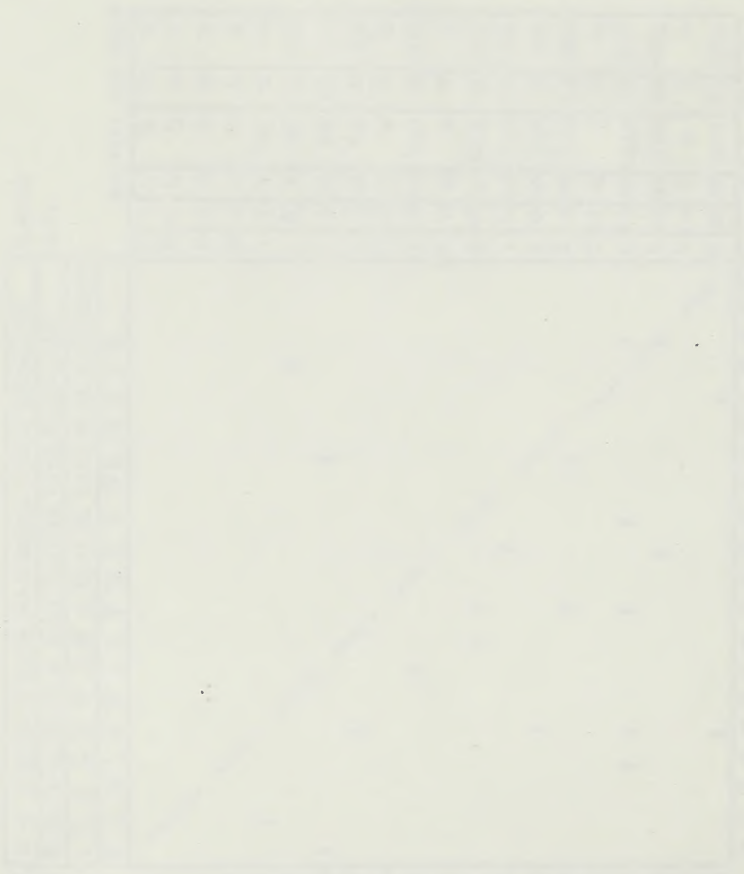
$$\frac{2804}{22} = 127.4545$$

$$C_x C_y = 124.5784$$

$$P = 2.5761$$

$$r = \frac{2.5761}{5.123 \times 4539}$$

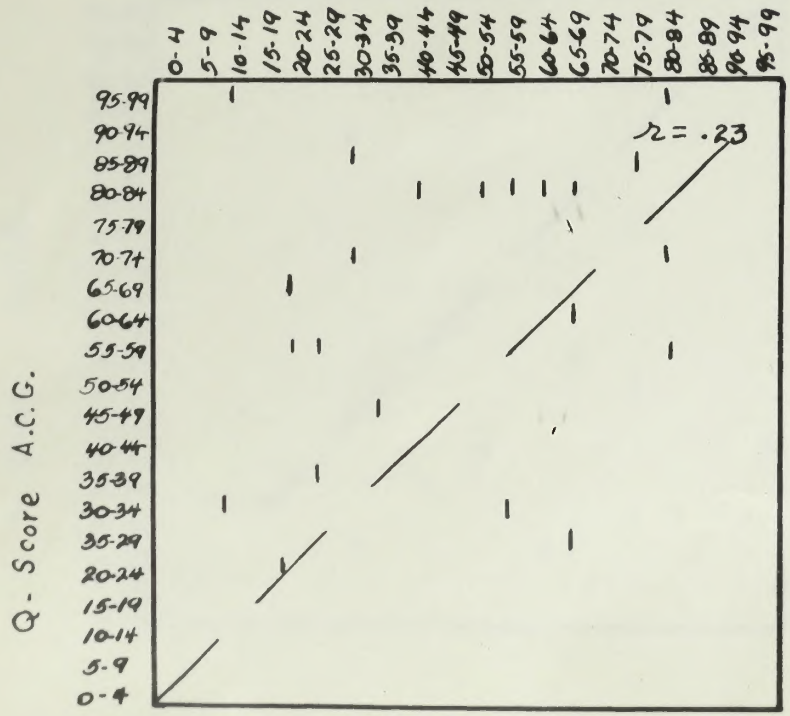
$$r = 0.11$$



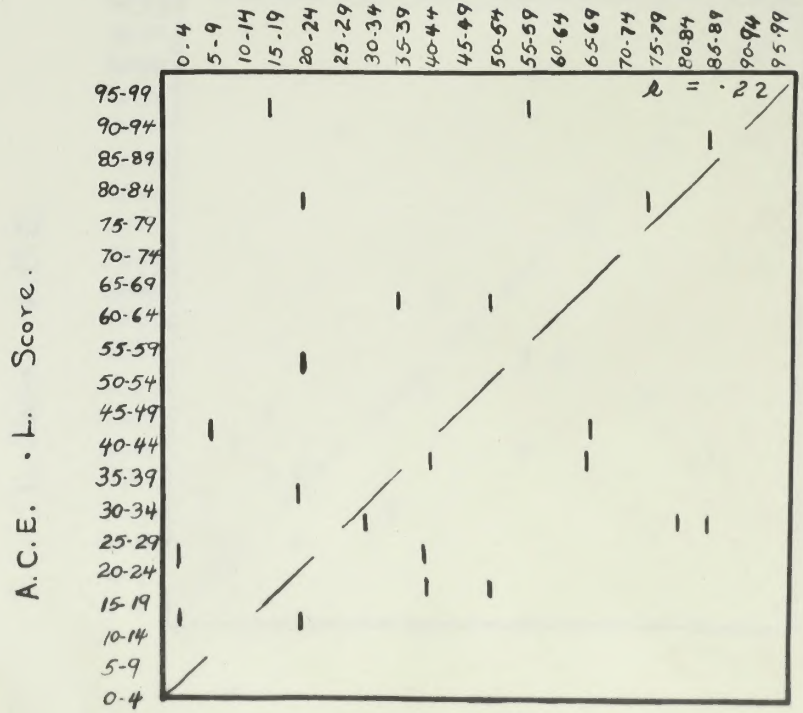
Chemistry - N.L.N.
Q Score A.C.E.
r = 1
0-4
5-9
10-14
15-19
20-24
25-29
30-34
35-39
40-44
45-49
50-54
55-59
60-64
65-69
70-74
75-79
80-84
85-89
90-94
95-99

Microbiology - N.L.N.
Q. Score - A.C.E.
0-4
5-9
10-14
15-19
20-24
25-29
30-34
35-39
40-44
45-49
50-54
55-59
60-64
65-69
70-74
75-79
80-84
85-89
90-94
95-99

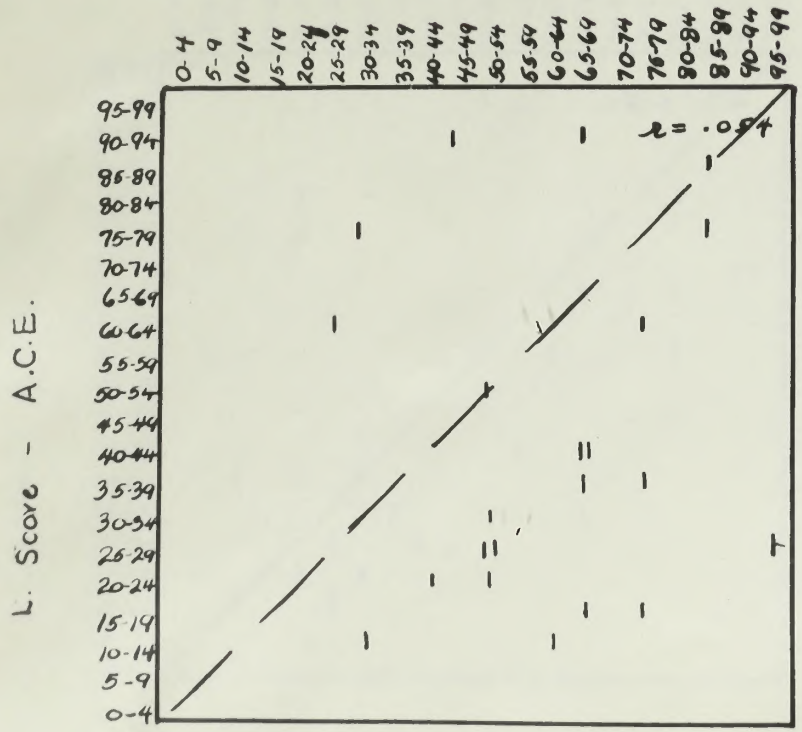
Anatomy and Physiology - N. L. N.



Percentile Grade Score



Chemistry - N.L.N



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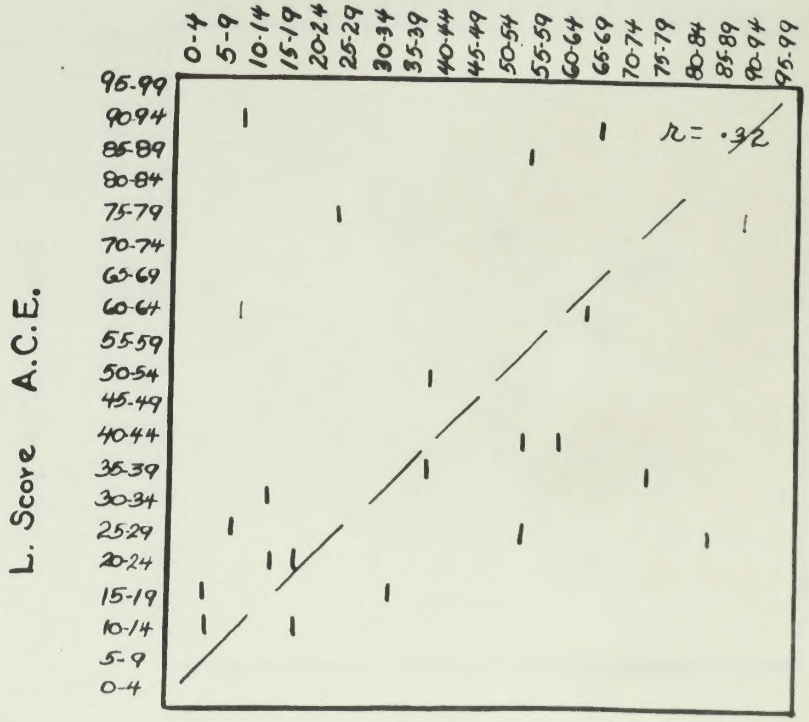
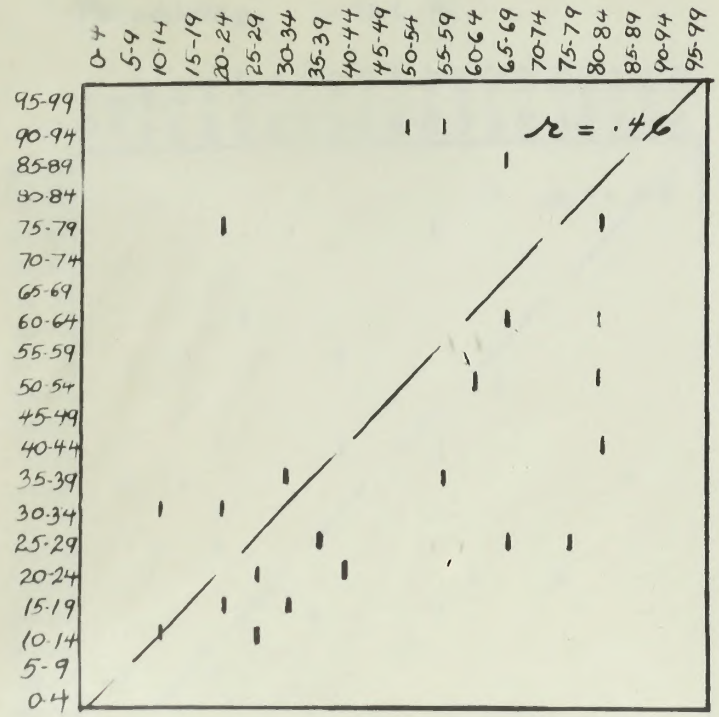
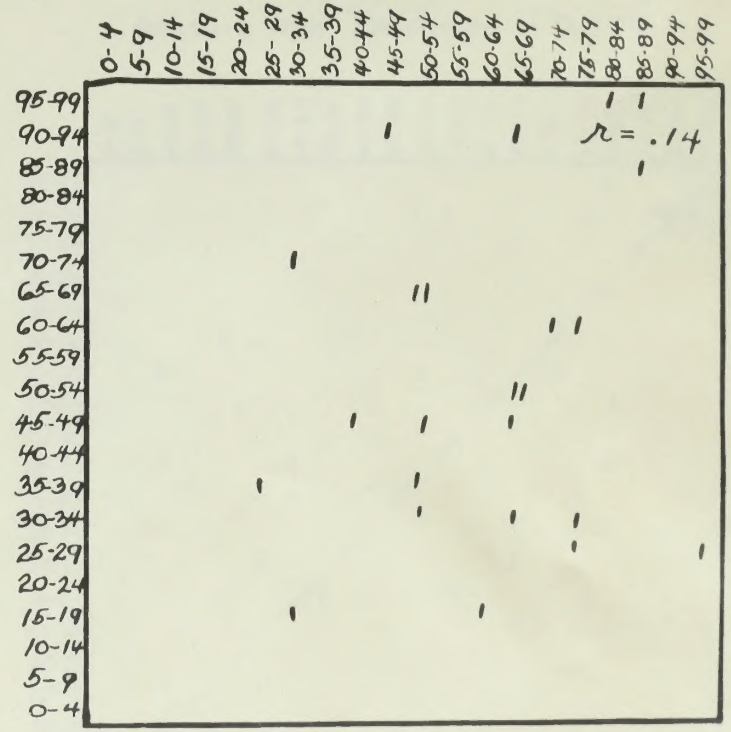


Anatomy and Physiology - N.L.N.



Chemistry - N.L.N.



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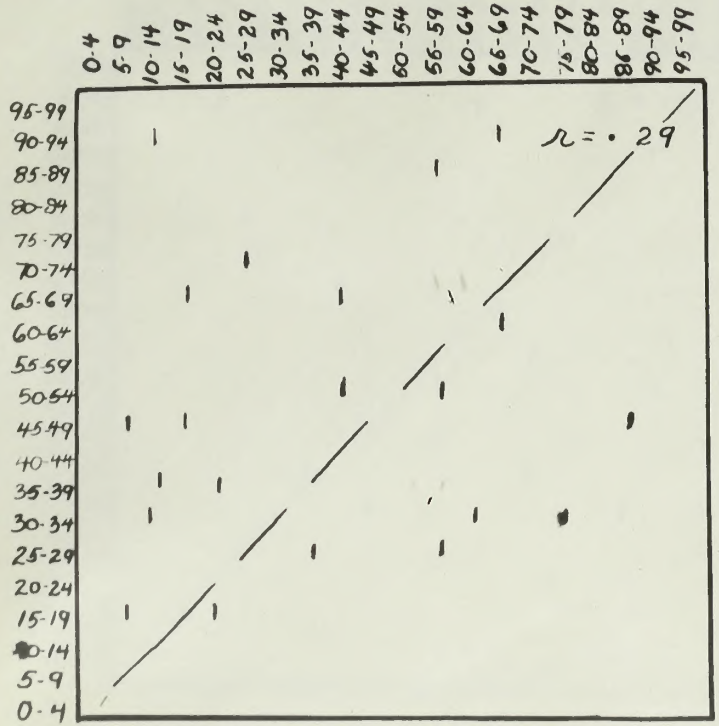

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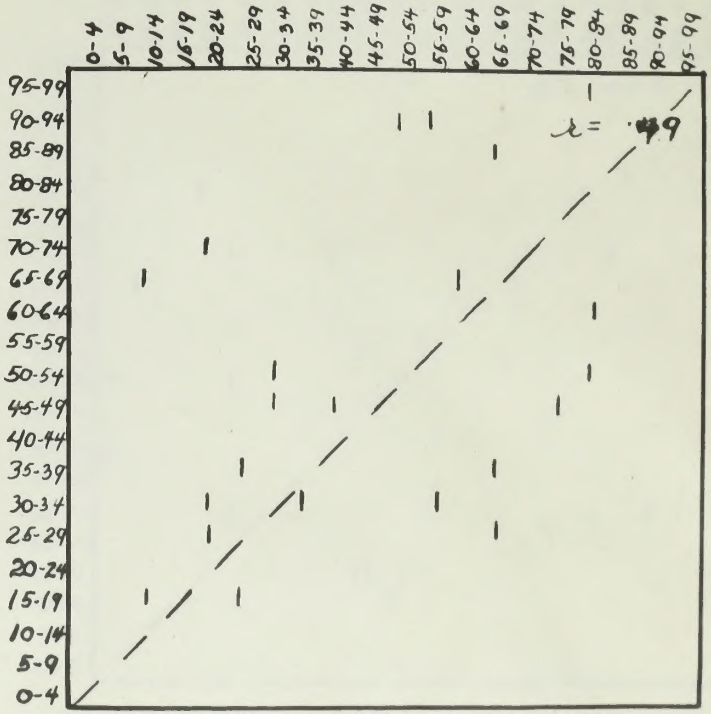

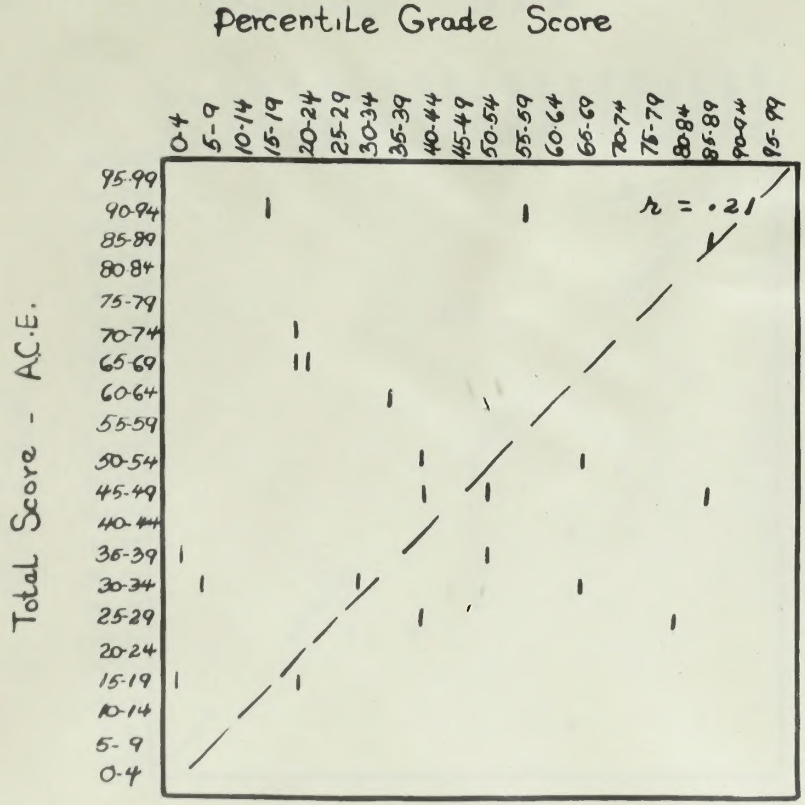
Percentile Grade Score
Total Score - A.C.E.
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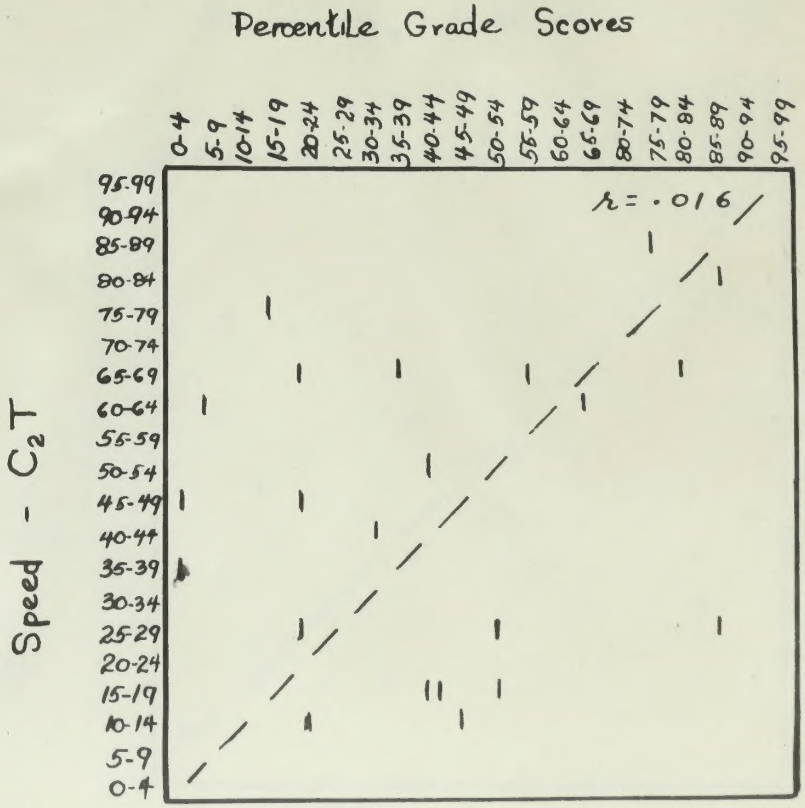
5-9
10-14
15-19
20-24
25-29
30-34
35-39
40-44
45-49
50-54
55-59
60-64
65-69
70-74
75-79
80-84
85-89
90-94
95-99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Speed - C2T
r = .016
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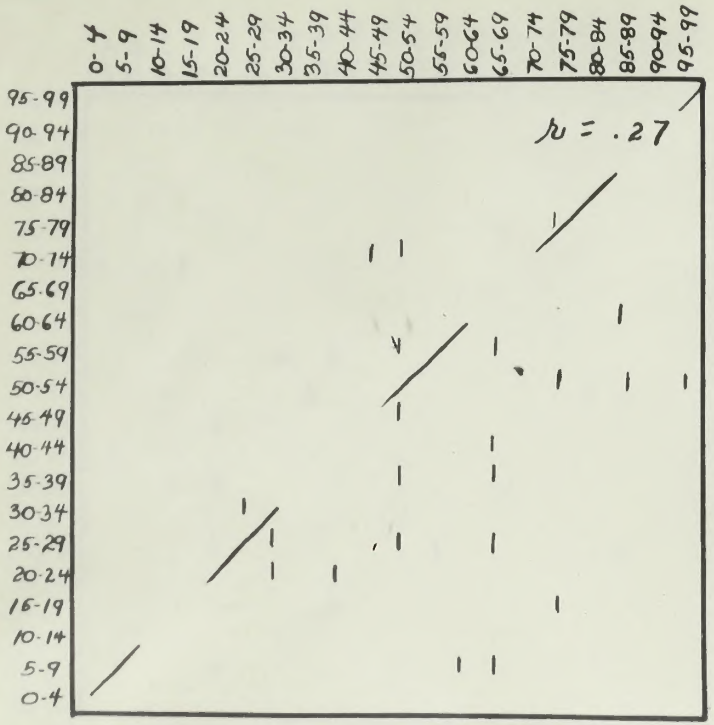
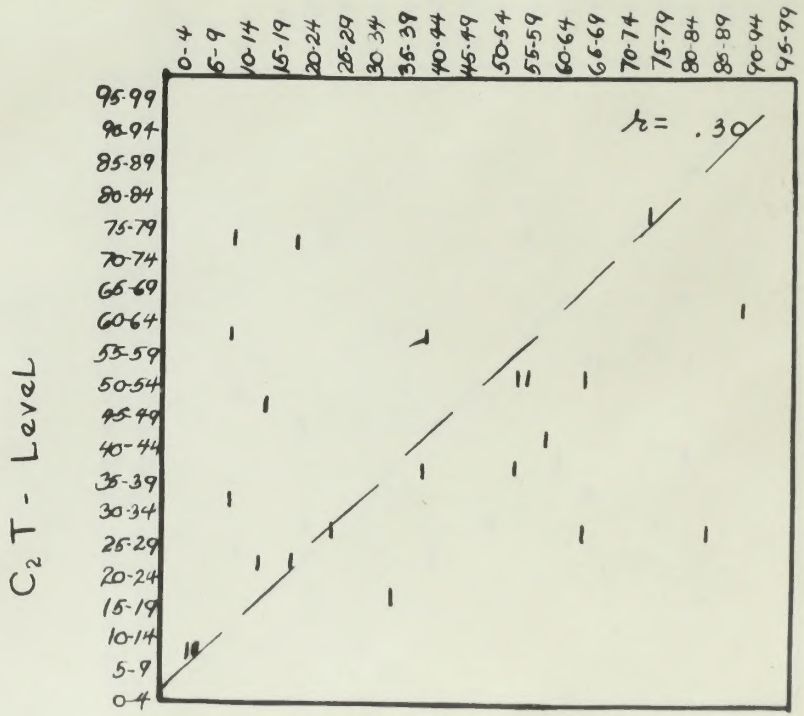
5-9
10-14
15-19
20-24
25-29
30-34
35-39
40-44
45-49
50-54
55-59
60-64
65-69
70-74
75-79
80-84
85-89
90-94
95-99

Chemistry - N.L.N.

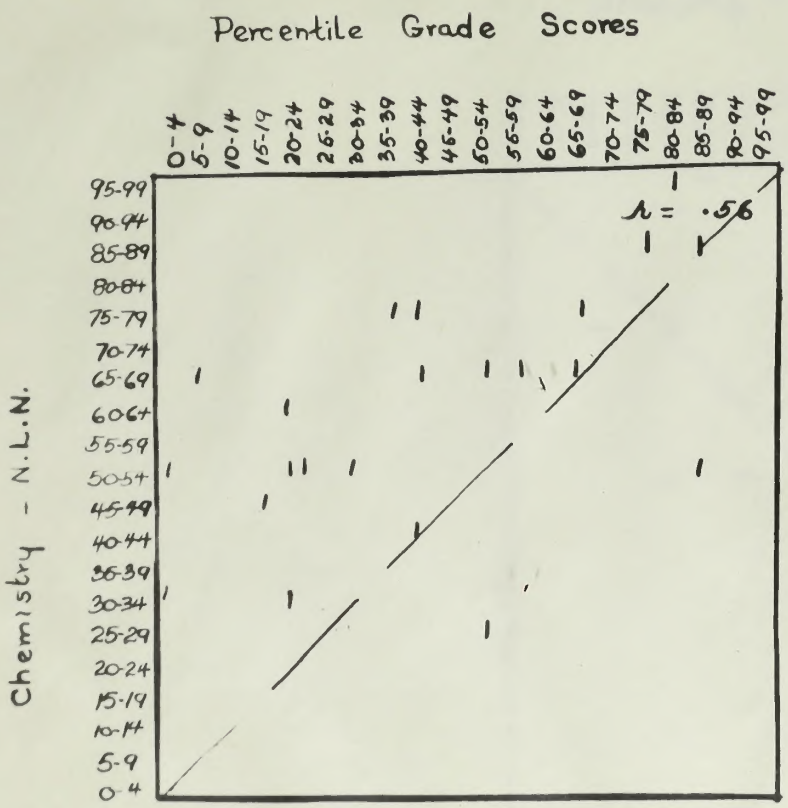


Microbiology - N.L.N.



Percentile Grade Scores
r = .052
C2T - Level
0-4
5-9
10-14
15-19
20-24
25-29
30-34
35-39
40-44
45-49
50-54
55-59
60-64
65-69
70-74
75-79
80-84
85-89
90-94
95-99

Anatomy and Physiology - N.L.N.
r = .29
C2T - Level.
0-4
5-9
10-14
15-19
20-24
25-29
30-34
35-39
40-44
45-49
50-54
55-59
60-64
65-69
70-74
75-79
80-84
85-89
90-94
95-99


Percentile Grade Scores
Chemistry - N.L.N.
r = .56
0-4
5-9
10-14
15-19
20-24
25-29
30-34
35-39
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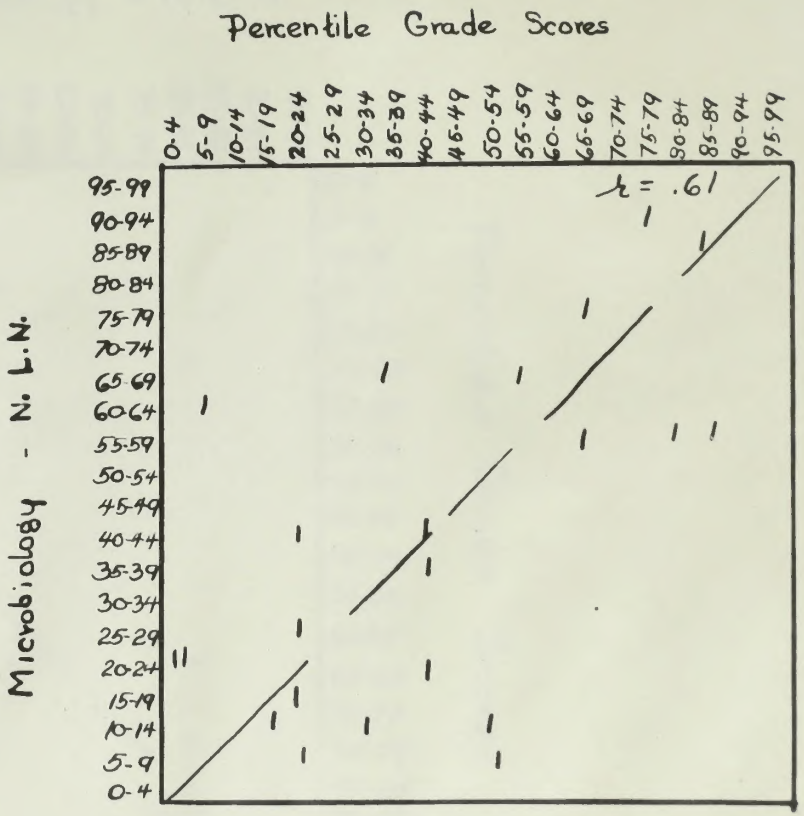
90-94
95-99


Percentile Grade Scores
Microbiology - N. L.N.
r = .61
0-4
5-9
10-14
15-19
20-24
25-29
30-34
35-39
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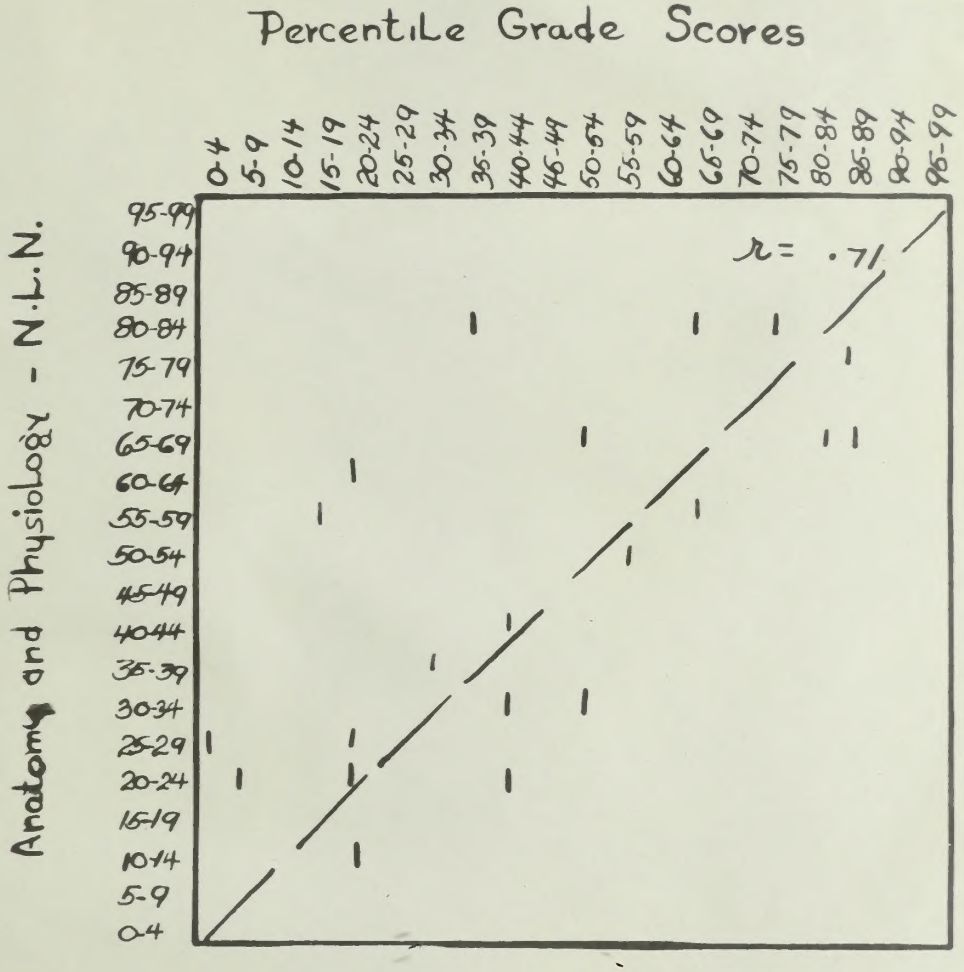
Percentile Grade Scores
Anatomy and Physiology - N.L.N.
r = .71
0-4
5-9
10-14
15-19
20-24
25-29
30-34
35-39
40-44
45-49
50-54
55-59
60-64
65-69
70-74
75-79
80-84
85-89
90-94
95-99

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Study to determine the value of predictive
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